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FRESHWATER ALGAE OF SOUTHERN AFRICA: 3. *PLEUROTAENIUM BREVE* RACIBORSKI VAR. *ENGLERI* (SCHMIDLE) KRIEGER AND *PENIUM GONATOZYGIFORME* CLAASSEN SP. NOV. FROM TRANSVAAL

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Abstract

Pleurotaenium breve Raciborski var. *engleri* (Schmidle) Krieger is reported for the first time from South Africa and a new desmid species, *Penium gonatozygiforme* Claassen, is described.

Uittreksel

VARSWATERALGE VAN SUIDELIKE AFRIKA: 3. *PLEUROTAENIUM BREVE* RACIBORSKI VAR. *ENGLERI* (SCHMIDLE) KRIEGER AND *PENIUM GONATOZYGIFORME* CLAASSEN SP. NOV. VAN TRANSVAAL

Pleurotaenium breve Raciborski var. *engleri* (Schmidle) Krieger is vir die eerste keer in Suid-Afrika aangetref. 'n Nuwe *Penium*-spesie word beskryf naamlik *Penium gonatozygiforme* Claassen.

Material and Methods

Samples containing *Pleurotaenium breve* var. *engleri* and *Penium gonatozygiforme* were collected from a small pan 16 km east of Ottosdal in the South-western Transvaal (approximately 26° 48′ S and 26° 07′ E). This particular pan originated from a pit from which gravel had been collected for road constructions several years previously.

The samples consisted of reddish-brown sediments collected in shallow stagnant water 5–75 mm deep. Two samples were collected on 4th April, 1972, and eight on 12th February, 1975. During December 1974 the pan was completely dry.

The hydrogen-ion concentration and the temperature of the water at the time of collection were pH 7,7 and 24°C, and pH 7,5 and 27°C for April 1972 and February 1975 respectively.

The material was preserved in 4% formalin.

Slides were made by mounting a sample droplet in a drop of glycerine.

Drawings were made with a Zeiss binocular bright field/phase contrast microscope using a Leitz micrometer-net-ocular and specially printed squared paper, the squares being 2 × 2 cm. The lenses used were a 12,5 × eye-piece and a 40 × objective.

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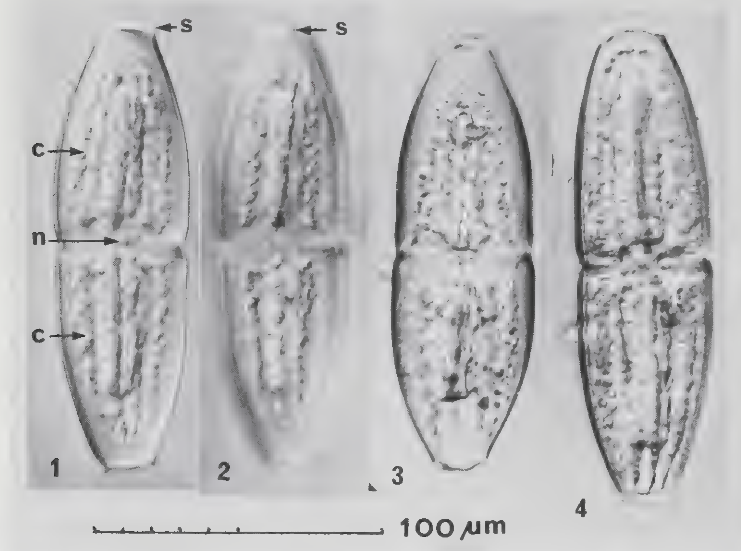
Photomicrographs were taken on Adox KB14 film using a 35 mm Willd microscope camera on a Zeiss Nomarski contrast microscope. A 6 × eye-piece and a 40 × objective were used.

All dimensions are given in micrometres (μm).

Observations and Discussion

Pleurotaenium breve Raciborski var. *engleri* (Schmidle) Krieger. (Figs 1–7).

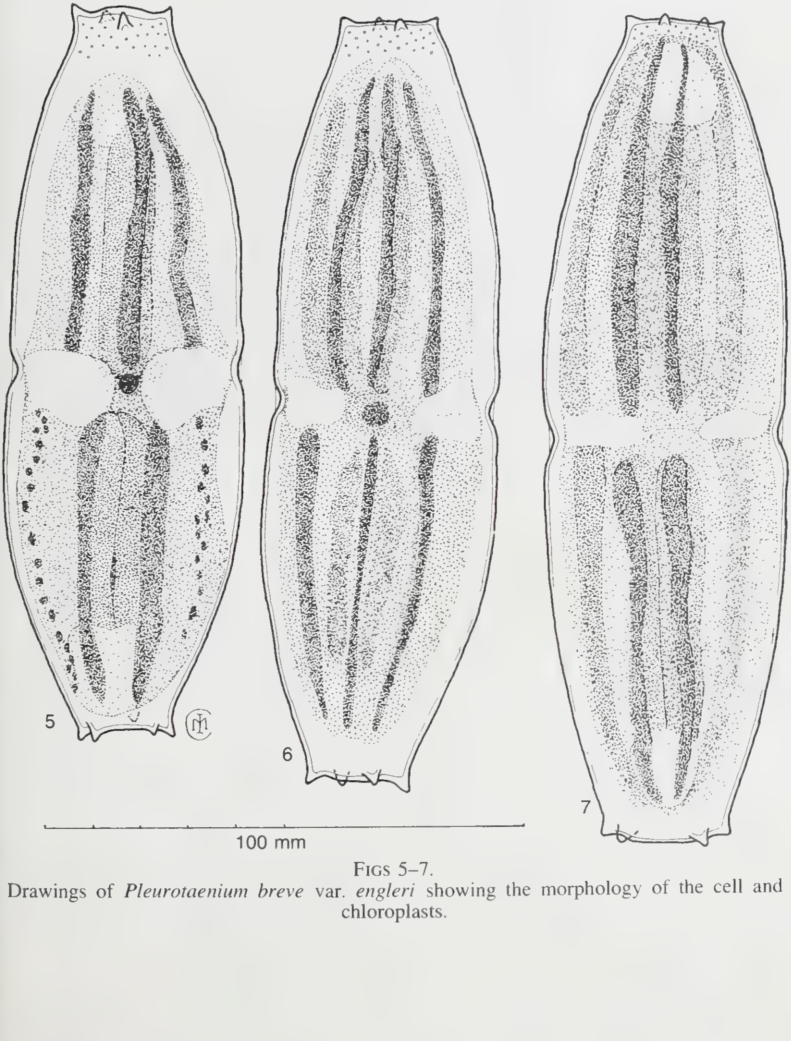
This desmid was originally described by Schmidle (1898, p. 23) as *Pleurotaenium engleri* from material collected in Central East Africa during June 1892. He mentioned that the taxon could be compared with *Pleurotaenium breve* Raciborski. Krieger (1937, p. 410) gave the taxon varietal rank under Raciborski's species. From the dimensions given by Schmidle (length 120, width 36) it is assumed that he found only one specimen.



Figs 1–4.
Photomicrographs of *Pleurotaenium breve* var. *engleri*. Figs 1, 3, 4. Morphology of the cell and chloroplasts. Fig. 2. The same specimen as in Fig. 1, showing the ridges of the chloroplasts. c, chloroplast; n, nucleus; s, spine.

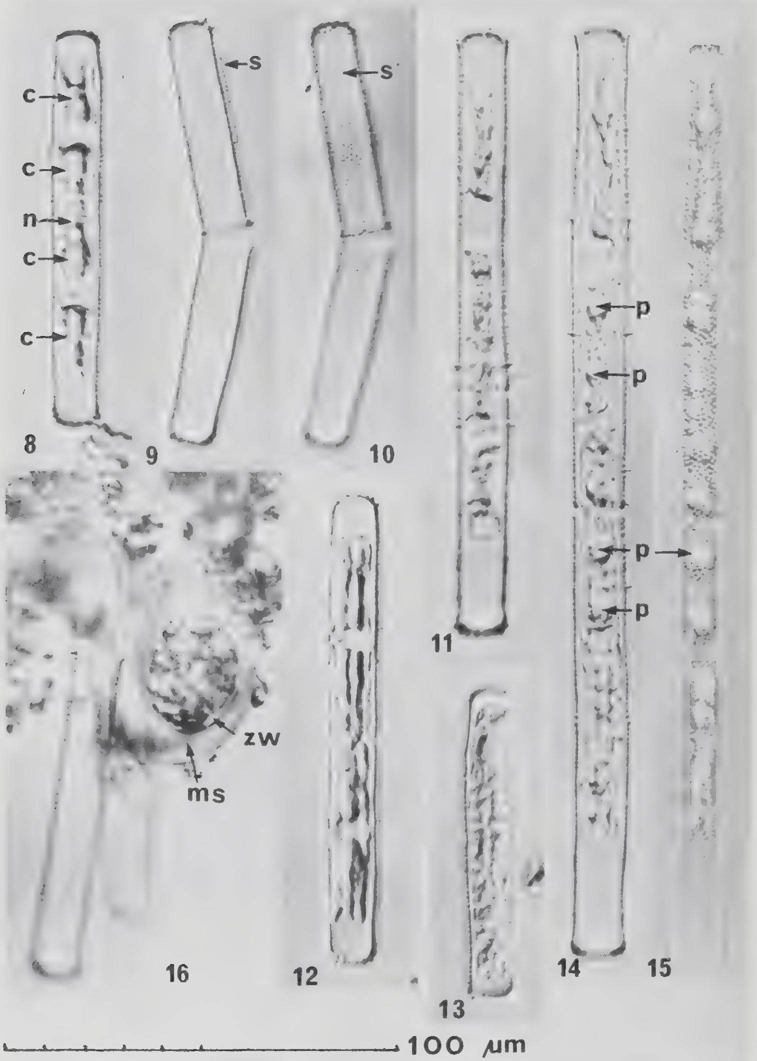
No further mention was made of this taxon in literature available to the present author until Lind (1971, p. 538) rediscovered it in material collected in Uganda during 1967. From the dimensions given by Lind (length 105, width 36) it is assumed that she, too, found only one specimen.

Since the present author examined more than a hundred slides and found only three specimens in the material collected in 1972 and none in the material collected in 1975, it is evident that this taxon is extremely rare. Although these specimens are larger than those found by Schmidle and Lind they are still regarded as members of the same taxon and not as a new form. The dimensions of the specimens are: length 151,8–169,5; maximum width 46,7–50,8; width of isthmus 44–48; width of apices 19,4–25.



Figs 5–7.

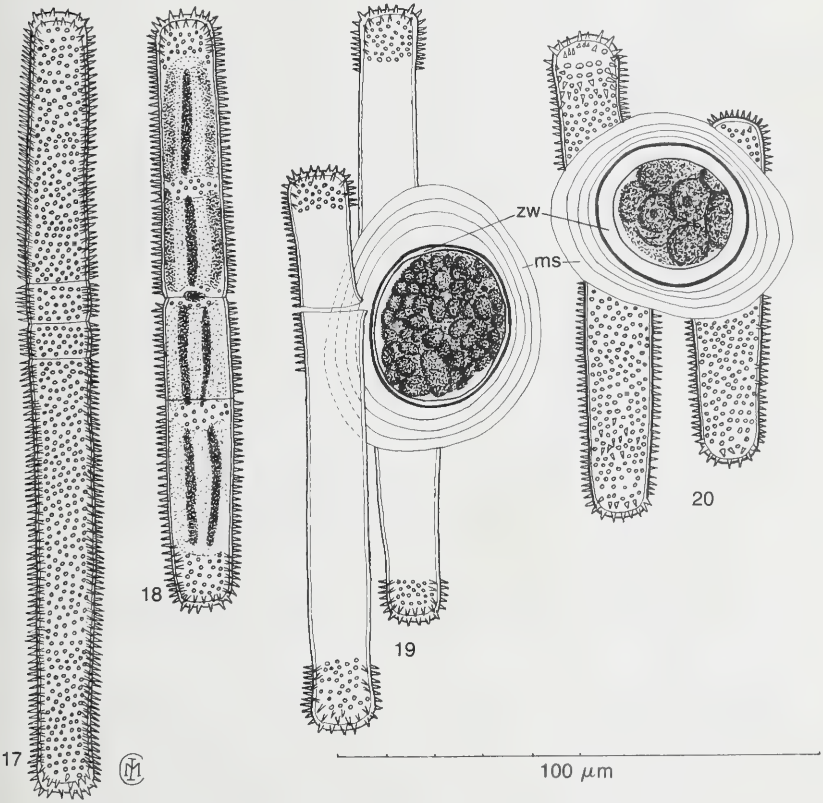
Drawings of *Pleurotaenium breve* var. *engleri* showing the morphology of the cell and chloroplasts.



Figs 8–16.
Photomicrographs of *Penium gonatozygiforme*. Figs 8, 9, 11–14. Various specimens showing the morphology of the cell and chloroplasts. Figs 10, 15. Surface views of Figs 9 and 14 showing the spines. Fig. 16. Conjugating cells with zygospore. c, chloroplast; ms, mucous sheath; n, nucleus; p, pyrenoid; s, spines; zw, zygospore wall.

None of the previous authors made any mention of the chloroplasts of this taxon nor were any depicted in their drawings. In the Ottosdal specimens each semicell contains one axial chloroplast with about 4–6 longitudinal ridges. No pyrenoids were observed.

Schmidle's specimen has four teeth at the apex of each semicell but Lind could distinguish only two. The Ottosdal specimens agree with that of Schmidle except for one specimen which has a fifth, slightly subapical, tooth in one semicell (Fig. 5, bottom semicell).



Figs 17–20.
Drawings of *Penium gonatozygiforme*. Figs 17, 18. Morphology of the cell and chloroplasts. Figs 19, 20. Conjugating cells with zygospores.
ms, mucous sheath; zw, zygospore wall.

Penium gonatozygiforme sp. nov. (Figs 8–20).

Cellulae circiter 5–13,6–plo longiores quam latiores, cylindricae in medio leviter constrictae, apices truncate rotundati. Cellulae paries incolor plurimis munitus spinis acutis late dispersis ac simillimis earum quae in *Gonatozygo aculeato* Hastings inveniuntur. Chloroplasti axiales, bini in semicellulis singulis, at singuli pyrenoidibus singulis vel ternis muniti. Zygospora subglobosa ac levis, vagina lamellata ac mucosa saepta.

Longitudo sine spinis 80–237; cum spinis 81,5–240; latitudo sine spinis 12,4–13,3; cum spinis 16,8–17,6; apicis latitudo sine spinis 10,6–12,4; cum spinis 14–15; zygospora 28 × 32–33,5; vagina 36–42 × 46–52.

Habit.: Transvaal—2626 (Klerksdorp): in palude parva XVI milia passuum ad orientem ab Ottosdal (−CC).
Holotypus: fig. nostra 17.

Cells about 5–13,6 times longer than their diameter, cylindrical, with a slight median constriction, apices truncately rounded. Cell wall colourless and furnished with numerous scattered acute spines. Chloroplasts axial, two in each semicell, with 1–3 pyrenoids each. Zygospore subglobose and smooth, surrounded by a lamellated mucous sheath.

Length without spines 80–237; with spines 81,5–240; width without spines 12,4–13,3; with spines 16,8–17,6; width of apices without spines 10,6–12,4; with spines 14–15; zygospore 28 × 32–33,5; sheath 36–42 × 46–52.

Type locality: Transvaal—2626 (Klerksdorp): small pan 16 km E. of Ottosdal (−CC).
Holotype: Fig. 17.

This taxon does not correspond to any other *Penium* species in literature available to the author but has a superficial resemblance to *Gonatozygon aculeatum* Hastings (Förster, 1974, Pl. 1, Figs 2–12). It is however distinguished from the latter by the placoderm nature of the cell wall and the two chloroplasts contained in each semicell.

Penium gonatozygiforme was fairly abundant in the samples collected during April 1972 but rather scarce in those collected during February 1975.

ACKNOWLEDGEMENTS

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